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STEREOSCOPIC PHOTOGRAPHY.

SECOND PAPER.

PERHAPS it may not be generally known among photographers of the present day, that a camera with two lenses, or a twin-lens camera, as the proper technical phrase goes, is not absolutely necessary for the making of stereoscopic photographs. Two pictures must indeed be made, and the two, moreover, must not be made from the same standpoint. It might be asked, then, whether a single lens could do the work, by throwing the image on the right and the left sides of an oblong plate in succession. We should answer, that this is not only possible, but that in many cases results superior to anything that the twin-lens camera could perform would be obtained. This is because the single-lens apparatus admits of any required interval of separation for the two halves of the picture; while in the twin-lens camera, as usually seen, the interval (represented, of course, by the centres of the lenses) is fixed, thereby necessitating that all subjects indiscriminately, whether distant or near, be photographed with the lenses standing at the same fixed distance from each other.

Before proceeding farther, let us say that a single-lens camera can never be used for making instantaneous views of moving bodies, inasmuch as the very nature of the work requires that the exposures of the twin pictures be made at the same moment of time.

It is true that single-lens stereoscopic cameras are now almost obsolete, but it is also true that views where much distance is included have not been improved by the use of the twin-lens camera, because the separation between the centres of the lenses is not sufficient to give effective relief in the finished picture. Just as the perception of solid objects and distances depends upon the conjoined action of our two eyes, which are separated by an interval of say two-and-a-half inches, so the apparent relief in the stereoscopic slide depends upon a proper interval of separation between the lenses. And practice has proven that the greater the distance at which the subject stands from the camera, the greater must be the distance between the lenses.

Ingenious theories have been advanced to prove that the lenses of a stereoscopic camera should be separated by the same distance as the human eyes, but the practical proof that these ideas are false will soon be seen by the following experiment.

PHILADELPHIA.

NEGATIVES BY WILLIAM H. RAU

Photograph a large ball, say a foot in size, with a twin-lens camera, at a distance of four feet, with the lenses separated two and a half inches, which is a fair average for the separation of the eyes. Now photograph a range of mountains twelve or fifteen miles away with the same outfit, taking care not to include objects very close in the foreground. It will at once be seen, when the views are placed in the stereoscope, that the ball is distorted so as to look like a cylinder with its end towards the observer, while the mountain-view presents so little of the characteristic relief of the stereoscope that it might almost as well have been made with a single lens on a single plate.

In other words, then, the amount of stereoscopic relief in the stereoscopic picture depends partly upon the distance of the subject from the camera, and partly upon the separation-distance of the lenses. The greater the distance of the subject from the camera, the greater ought to be the interval of separation between the lenses, or what amounts to the same thing, between the points from which the twin views are taken.

In the earlier days of landscape photography, views were taken almost exclusively with the single-lens camera. An oblong plate-holder was used, and the camera was shifted from side to side between the two exposures. The top of the tripod was arranged like a small table, with a scale of inches marked off from left to right, and a thumb-screw attachment for clamping the camera firmly at any desired point of the table. The manipulations were quickly and easily done. The plate being prepared and the view focused, the holder was set in the camera so that the *right* side of the plate was exposed, the camera being at the *left-hand* side of the table. The exposure being finished, the camera was shifted over to the right side, and the left side of the plate exposed by shifting the holder also. This gave a negative that needed no cutting apart and transposition of the two sides, but which, when finished, was ready for the printer.

In the course of our articles written in this journal for the improvement and entertainment of our readers, we have frequently mentioned the albumen transparencies made by the late Mr. Ferrier, of Paris. We have always stated that their quality was unsurpassed; indeed, that they might be called classical models of the photographer's art. We refer to them again, in order to say that the collection included a large number of stereoscopic transparencies of distant landscapes, which were made with the wide interval of separation just spoken of. No other arrangement of the apparatus could have given the fine relief and beautiful succession of receding planes of distance.

A point in favor of this single-lens apparatus is its cheapness and simplicity. The most modest 5x4 inch camera, with a cheap single meniscus view-lens, could be made to do good work, and if an oblong plate-holder for the 8x5 inch plate could not be had, the two 5x4 inch plates, in an ordinary double holder, could be exposed in succession. In selecting the view, the position of some prominent object at or near the centre of the plate should be noted, so that, when the camera is shifted to the other side, the same object shall come upon the same point of the plate.

Everybody who has worked stereoscopic photography knows that the print from the negative made by a twin-lens camera must be cut through the middle, and the sides transposed in mounting. If this were not done, the picture would present the

paradoxical appearance of the distant objects being nearer at hand than the near ones themselves. This curious effect has been called pseudo-scopic.

The labor involved in trimming and mounting stereoscopic prints is considerable, and if the work be done commercially, adds a good deal to the cost. It can be avoided by cutting the original negative and transposing the two halves, but great care must be taken to bring the centres of the twin pictures at the proper distance from each other laterally, as well as precisely equi-distant from the bottom or base line. For instance, if the centre point of one of the twin negatives were ¼ or ⅜ inch higher than the other, the pictures could not be made to combine well when viewed in the stereoscope. Complaints would then be made that it was a strain upon the eyes to look at them.

Now, supposing the negatives to be made on paper or on films, the accurate adjustment spoken of will be an easy matter. But if made on glass plates, where the diamond has to be used for cutting, the risk of damage to the negative is very great indeed. Not only is this true on account of the skill required in handling the diamond, but also because, when a finished negative is cut through the back, the gelatine film is very apt to tear or lift itself up from the glass at the line of incision. A gentleman of much experience informs us that it is not his custom to cut original negatives in this manner, but to reproduce them on glass and cut the duplicates, if the number of prints desired makes it worth while. Amateurs would do well to observe the same caution with valuable negatives.

ELLERSLIE WALLACE.

THE ART SIDE OF PHOTOGRAPHY.

(Read at the Boston Convention of the P. A. of A.)

THE time was when it was considered a mark of good breeding to listen to a twice-told tale with all the interest and courtesy due to a first telling. This age has been aptly described as smart and slangy, and if one is unfortunate enough to commence the relation of a story to another who has heard it before, he is brought up very short by the single word *chestnuts*, or *rats*. This may be smart. It certainly is slangy, but I doubt if it is wise, and I know it is not courteous.

It is not wise, because the fear of ridicule would prevent many subjects being introduced into conversation which might be interesting or instructive. It is not courteous because, although not new to you, it might be new to others.

So it is with something of this fear upon me that I open the subject of this paper for discussion. To many of the veterans of the profession it may be chestnuts, but there are others here that a few hints upon the art side of photography may benefit, and to such I offer them; asking the indulgence of the veterans who know all about it, for the sake of the younger members who do not.

What is art, and what are the rules that govern the production of pictures by photography? Practically speaking, there are no hard and fast rules in art. There are, more properly speaking, principles, which are more or less elastic, but those rules or principles have been formulated by men who have passed their lives in the study of nature, and its representation upon cameras, and these same rules, or principles, must be observed if your photograph is to deserve the name of picture.

The attempt to make pictures by photography dates back to the very early days, Reijlander and Robinson, Hubbard and Ristin, in England, having produced them twenty years ago under disadvantages that you younger generation of the craft know nothing of, as you will probably appreciate when I tell you that in one of Hubbard's compositions (Stolen Moments) he told me he made twenty-one exposures upon one model before he got one negative to satisfy him,—the exposure being five minutes,—to get the effect he wanted. The light had to fall upon the picture in such a manner that the shadow cast upon the wall behind her became a principal feauture in the composition. Therefore the light had to be cut off except through a very small aperture, hence the length of exposure.

No artist who is unacquainted with the difficulties which beset the photographer in the production of this plan of work can rightly judge of the results of his labor. Photography is certainly not a plastic art. The photographer must arrange his composition under his skylight complete in all its parts; he must enthuse his model with the sense of the part he or she has to play. He must pay attention at one and the same time to the linear composition, the composition of light and shade, and the pose and expression of his model. All this he must see is perfect before he uncaps his lens, and when the result is before him he has not the power of making corrections in part,—he must reproduce the whole again with the defective part corrected, perhaps to find some other small defect overlooked in another part of the picture, and so to have the work to do all over again.

Of the linear composition there appears, from the glance I have had around the walls of our art exhibit, very little to say. There are some instances of too rigid adherence to the principle or rule of making the lines balance each other, the lines of the composition being so arranged that they should not be conspicuous reproductions on the right of the lines on the left of a composition.

Concentration or focus is the one quality which is defective in most photographers' productions. When I say focus I do not mean optical focus but artistic focus, which means the arrangement of the light and shade in a picture in such a manner that the eyes are compelled to look first at that part which is the centre of interest.

In a portrait this of course should be the face, and in a subject picture it should be the figure or figures upon whom the story to be told centers. How then is this to be done?

If I take a black board and make a white spot in the centre you will have focus or concentration in its crudest form. Also if you put a black spot on an expanse of white there is concentration; therefore if the face is surrounded by background and drapery there will be concentration or focus upon that face, but that is not all that is required; there must, to avoid crudeness, be present a quality called breadth, which is obtained by bringing into the shadow lights of lesser intensity than the principal light, thus distributing the light throughout the picture and bringing out the details, which should be kept lower in tone the more they recede from the central or dominant lights. This quality which to an artist is the most essential to a picture, is the one which is most disregarded by the average photographer, and many good photographs, judged from a chemical and manipulative standpoint, are completely spoiled by the absence of this artistic quality. How often do you see a portrait, for instance, a white cup, or some ornament on a table contending in intensity of light with the face, and so giving a spotty effect to the composition, with a very few exceptions. The composition of the pictures exhibited this year is defective in this particular; in

some there are as many as four spots of light of equal intensity, all calling for attention at one time, thus destroying both concentration and breadth.

There are several examples to be seen of a style of picture which requires skill and judgment both in lighting and chemical manipulation. I allude to pictures where the face is in shadow against a lighted background. When managed properly they are among the most artistic effects which can be produced by photography. But it requires great care to keep the harmony of the composition there. In one which, as it is in the exhibit of one of the dry plate firms, it will not do the exhibitors any harm if I describe it and point out where an otherwise good picture is spoiled artistically by neglect or want of knowledge, the face and figure are posed against an almost white background. The upper part of figure and face are splendid, but the lower limbs, cutting with a hard line against the background, cause the eye to fall on that point and follow down to the base of the picture, thus making the head of secondary importance.

This reminds me of an anecdote of the great critic Ruskin. He was asked by one of our eminent R. A.'s to criticise a portrait. The painter was one of the Pre-Raphaelite school, and Ruskin, adjusting his glasses, commenced with the hunting boots and went upwards somewhat in this fashion: "Yes, the boots are well painted. The tops are quite good, and the texture of the cord breeches is perfectly rendered. That velvet coat, too, the material could not be mistaken." Then, after a slight pause of astonishment, as if it was the last thing he expected to see, he said: "Why, bless my soul! there is a head too!" That artist said after that he had learned a lesson he never forgot.

Now if in the picture I was describing, the background had been graduated so that, while the upper part was lighted, the lower part was shaded enough to prevent the hard cutting line, the head would have attracted the attention of the spectator first, and the concentration have been in the right place, for remember this, that wherever a dark line cuts against a light there will good concentration or focus be, and if you will study the works of great artists you will always find that the highest light and the deepest shadow are near together, and there is focus or concentration.

Another noticeable fault of those photographs which I find most praised by professional photographers for their brilliancy in texture, is that, either by the method of lighting or by over-retouching, the real texture of the flesh is not seen, and a face, instead of appearing as if it would yield to the touch of the finger, has a stony shine, which is like something metallic rather than flesh.

Now, in my opinion, there is nothing so beautiful as the texture of a properly exposed, well developed negative, and I consider that in such a one only the defects caused by the colors in the flesh tints, which photography does not render properly, should be removed by the pencil of the retoucher, and that in such a manner he preserves the original photographic texture, but when in his ignorance and conceit he thinks he can work all over a face, and make a texture which is an improvement upon nature, a sort of Madam Rachel complexion in all alike, men, women and children, I consider he has mistaken his vocation. If I had any influence, I would try and get the Committee of this Association to give a prize to the retoucher who could do the best work upon a negative with a pencil, and yet do all that was wanted and preserve the texture. I think one of the things which makes the exhibit of Mr. Muneler so admired is just this point;—while all photographic defects are removed there is an exquisite texture throughout the whole exhibit.

I could have said much more on this subject, but there are other things which

will be brought before you this evening, so I will conclude by saying I hope you will not think I have been hypercritical; while there is much to criticise there is much more to praise, but as we learn most by our failures, I thought these few hints might be of use to you.

G. HANMER CROUGHTON.

MR. BOGARDUS ON THE MUTUAL BENEFIT ASSOCIATION.

(*Before the Boston Convention of the P. A. of A.*)

Mr. President, Ladies and Gentlemen:

IT gives me great pleasure to have an opportunity to explain to you the intentions of the Mutual Benefit Association. I find that it has been ridiculed, misunderstood, and in every way wronged. For we have but one object in view, or I should not have touched it, and that is, the elevation and lifting up of photography from the low level to which it has descended. (Applause.) No man, no ten men, no one hundred men, can do it. But the entire body, backing the men who have undertaken it, can do it, and we can control our business. And are photographers to stand still and see photography go down hill and down hill every year, and year after year, and do nothing to help it? If that is the case, I have misunderstood my companions. When I commenced making daguerreotypes, a good many years ago, it was a scientific business. A man who made a good daguerreotype was looked upon as somebody. The difficult, delicate, mystic art was considered something for a man to accomplish. It was not as it is to-day. Not everybody that could snap a camera could make a picture. It has been very amusing to me sometimes to have ladies come into my office and say, "Oh, you have no idea how well my Alfonzo is getting along! He even beats you professionals. He has got one of those cheap amateur outfits, and you have no idea how well he has succeeded. Our family cat was asleep in a chair one day, and he took the cat, and there was a little white spot on the cat's tail, and you could see—(Tremendous applause, laughter, and cheers)—the white spot on the picture just as plain as can be." We did not have anything like that then. His father is one of the directors of the grab-all bank on Wall street, and his father thinks of buying him a set of apparatus and setting him up in business because he has been so successful, because he has shown the white spot on the cat's tail. (Laughter.) I tell you, we pioneers had to do something more than to show spots on a cat's tail. Photography is little understood to-day. I hear young men say, "You old fellows have a hard time making pictures. Just see how easy we do it. We just do this (illustrating) and it is all done, and if we do not develop in mother's pantry all right, we take it around the corner to some snap artist, and he fixes it up for two shillings." The young men of our time did things in a very different way. It is the tendency to simplify all difficult things. By and by somebody takes it up and says, "Oh, see how easy we do it!" But the man who overcomes difficulties is the man to be honored.

Now, as I said, I found photography a good thing. My days are nearly numbered. I will not be with you much longer. I want to leave photography where I found it, and I am willing to work to bring it up to where I found it. And to that end alone I labor; and anybody who accuses us of selfish motives, does a thing which is too far beneath my notice for me to answer it.

I have prepared a paper here for fear I might say something that I did not intend to say, or that I would leave something out that I did intend to say. You will excuse me if I read the paper.

I will give you a bit of "ancient history." The entire photographic fraternity had heen hampered and hindered by the "bromide patent," until it became such a burden that some determined men, thinking it was time to put an end to such an expensive nuisance, called a meeting at Cooper Institute, New York, inviting all the men in the profession to meet them. This was in 1868, and I well remember the call for that meeting. It was signed by only seven (7) names, and two of them were Boston men, I. W. Black and George H. Loomis. That was the first time, to my knowledge, that these men had met each other, and had no other object been accomplished than the opportunity to get acquainted, it would be called a success. Coming from different cities, and well known to each other by name, yet it was the first time we had seen each other face to face, and I believe from that hour we felt a brotherly feeling before unknown. We felt that "men who made faces for a living, should stop making faces at each other." A committee was appointed with ample powers to bring about the desired result, and, as is usual in such matters, one man did the work, and that man is with you to-day, and I doubt if the fraternity ever fully realized the amount of research and labor he performed. I mean Dr. Edward L. Wilson. I need hardly add, the extension of the "bromide patent" was prevented.

Now we have another enemy to combat. It is an enemy with octopus arms, reaching in every direction; its slimy touch and deadly grasp is destroying our beautiful art. Different subjects require different treatment, and we do not believe that any committee or any one man can destroy or even curb this enemy. But we do believe that the whole fraternity combined can do it. Now, is it worth the effort? Are the members of the photographic profession ready and willing to take hold of this matter and do it?

We well know that there are those who, from fear or cowardice, say it cannot be done. The men who have undertaken this work are neither blind nor deaf. We have seen all that has been printed and heard much that has been said, and it were better that some of it had not been printed or said. Some articles have been written by persons who, while confessing their ignorance of the inner workings of the Photographers' and Artists' Mutual Benefit Association, yet stab it.

It is interesting to see the effect the announcement of such an association has had on the incredulous. One thinks, "It's a scheme of second-class artists to get some business and raise their prices." Another, "Designing schemers are at the bottom of it." Another, "I think it is the work of some labor agitator," and one writes, "The title is in bad odor with all but the few whose pockets the organization it represents is intended to fill." "Too aristocratic," says another. I like to see men have an opinion, even if it is adverse.

We have heard all these opinions (not very valuable), and to men endeavoring to do such good work for the benefit of all, it has been rather galling.

The "yaller" dog becomes greatly excited, makes lots of noise, and disturbs the whole neighborhood in barking at the moon; but the moon goes right on, lighting up the world with its quiet splendor, and the dog as well. I have not done with the canine yet. Sometimes he does not venture out of his den, and there, with his body well protected, he risks only his head outside, and seems to think the noise he is making is enough to vanquish anybody, or if he sits outside. I have never heard

of his mounting very high in his endeavor to inflict injury on his brilliant enemy. After tiring himself out, judging his efforts vain, he gives his longest, loudest whine in his highest key, and sneaks off with his tail between his legs, and if disheartened and discouraged he never admits it; and, after rotating around nothing for awhile, seems to forget his defeat, as John Bright once said, "In managing to make both ends meet." Beecher once said, "No great work for the benefit of mankind was ever entered into without disturbing somebody. The farmer, in plowing his field to sow the seed for the future harvest, disturbs some grubs and worms, but he must not stop because of that."

The subject of low prices has interested the whole profession, and yet nothing has been done to stop its ravages. No decided steps have been taken, as it was a very difficult subject to attack. Even in the Convention the subject was passed in the wish that something might be done, but no decided action toward doing it was taken.

Several gentlemen, after careful deliberation, have decided on a plan to place photography on a higher basis and at the same time to stop the rate cutting. To do this we need the combined efforts of all the reputable men in the profession.

With employer and employee combined this matter can be controlled. Thus both will be benefited, and the remuneration both are receiving will give them both what they should receive for good work; and this allowing anything and everything to pass because they cannot afford time to do their work well at the low prices prevailing will be stopped.

This cannot be done in a day; but it can be done, and done effectually, if the men in the profession will sustain the effort now made. It is a matter of life or death—or, if you please, of dollars and cents. If this effort fails for want of support, when or by whom will another attempt be made? It is now or never. Photography is low enough now, and this attempt to raise it failing, it is gone beyond redemption.

Are there those who wish this to continue?

Do they wish photography to keep on running down lower? Where would you have it? Instance fifty cents for re-sittings.

I will illustrate. An operator who worked for me in New York City told me how it is done: When a man comes in with his ninety-nine-cent ticket, they give him one sitting on a plate five by seven. I think it costs him seven cents. They seat him this way (illustrating), squinted-eyed at first, on purpose. He does not like it after he sees the proof, and has to pay fifty cents for resitting. He pays his fifty cents for re-sitting, and they give him another one around on the other side. Fifty cents again for re-sitting. And if he gets anything at all, when the orders are finished he has to pay fifty cents for satin finish. That is the way photography is practiced to a great extent in New York to-day.

Now, here are reliable men ready to take the "bull by the horns," and some of those opposing it should be the first to favor it.

Zeal is good, but zeal without knowledge is like the "crackling of thorns under a pot,"—much noise with little result. But "none of these things move us"—we shall not turn back.

I confess when this matter was first presented to me I thought it an impossibility; but when I learned more fully its intentions, and saw the array of names ready to enter into the work, I said, If such men combine and are backed by the respectable

men in the profession it can be done, as such an association is well-nigh impregnable.

From the immense number of names already enrolled, and the rapidity with which it is filling up, it looks as if it would soon be unanimous, and that is what we need for success; with unanimity we can control this matter.

Men in other professions find it necessary to combine for their own protection, and are the photographers too blind to their own interests to endeavor to protect themselves? One says, "I want to know how you are going to do it." Well, to reveal our plans would be to forewarn the enemy and put him on his guard; we cannot reveal what we propose, as different cases require different treatment. Would it be wise to tell? Does the chief of police send word to the thief of his intentions, so that the light-fingered gentleman may know what to expect?

Another says: "Some part of it is secret, and I am not going to unite with it because I want to see all that is going on." Well, my friend, you would make a poor farmer; you are not willing to risk your seed underground out of your sight, because you wish to see it germinate; that doctrine carried out would give you a poor crop indeed. The little onion seed must remain hidden from view where nature does her work, or you will fail to receive any return of fruit or fragrance.

If, after joining us, you can show to the satisfaction of all concerned a better way, gladly will it be adopted. In my connection with it I have not found anyone so tenacious of this plan as to be unwilling to employ another, if thought to be more efficient.

Sometimes we are propelled by the force of circumstances. Paddy, when driving the bull, tied the rope around his waist; the bull began to run, and Pat had all he could attend to in keeping up with his new leader. As he turned the corner some one asked, "Pat, where are you going?" "That's just what I'd like to know mesilf," says Pat. "Ask the bull!" And so it is with some enterprises into which men enter. A man conducting a business finds it much greater than his most sanguine expectations, and instead of driving his business, the business drives him, and with such rapidity that he wonders where he is going and how it will end if everything continues. As it became wider known, its numbers increased with such rapidity that they are now numbered by thousands, and its resources are formidable, and we sometimes feel like "asking the bull" All sources of danger are carefully guarded, and unless something now unseen prevents, its ends and aims will be successfully accomplished.

We say to stand still will not accomplish anything. If we try we have every prospect of succeeding. Example, the dying Scotchman:

An old Scotchman, who was very rich, was told by his physician that he could live but a very few hours. The old man had attended more to the gaining of money than to looking after the interests of his soul. But when he was told that he began to get anxious, and sent for his old Scotch clergyman, and said to him: "Dominie, if I should give five thousand pounds to some benevolent object, do you believe it would be the means of the salvation of my soul?" The old Scotch minister did not want to commit himself and say that heaven could be bought with a man's money, but he did say, "I don't say it would, but I do say it is well worth trying."

Now, gentlemen, while we may not accomplish all that is desired, we do say "it is well worth the trying."

I want to answer a few things that I have heard since I came here. I had known

that the newspapers had misrepresented the thing, but I had no idea that such ridiculous stories had been told about a thing that was calculated for the benefit of all. We have heard that stock dealers were against us because they thought we might boycott them, as the expression is. The word boycott, or the thought of it, has never, never entered into the calculations of the Association, never. Some of the leading stock dealers said to me this morning: "We are in favor of anything that will help photographers, and we are not responsible for the acts of our subordinates." Sometimes the authorized agents have said too much. It is just as if the clerk in your store should say a little more to a customer than he should have said without your knowledge and consent, and thus make an enemy of that customer. We find that has been done sometimes. We shall stop that by all the means in our possession.

NOTES ON SOME PHOTOGRAPHS OF LIGHTNING AND OF "BLACK" ELECTRIC SPARKS.

(*London Philosophical Magazine.*)

DURING the thunderstorm on the night of June 6th, I exposed several plates in the hope of securing photographs of lightning. Three of these gave results.

One was exposed to two flashes, not counting such as did not cross the field of view. These two flashes show complicated and beautiful structure. One of them is a multiple flash, distinctly seen as double by both my wife and myself. An enlargement of this shows curious flame-like appendages pointing upwards from every angle. The other flash is a broad ribbon. The images of the masonry in the left-hand corner (which are necessarily slightly out of focus) show three positions of the camera. They are sharp, hence the camera did not move during the existence of a flash; and the directions of those movements which did occur do not in any way correspond to the movements (if such there were) which would have been required to produce the ribbon-like effect from a linear flash.

A second plate shows four flashes, and the camera moved much more than in the first case. None of these flashes are ribbons. Development showed the plate to be overexposed.

The third was exposed to six flashes; that is to say, I judged that six of them crossed the field of view. There were many others between times, which were either in the clouds or occurred in other parts of the sky. One flash, I remarked at the time, must be "right down the middle of the plate." Development showed this plate to be very much overexposed, and the image required careful nursing. I was much surprised to see nothing but one triple flash in the corner. I supposed that I must have mistaken the plate, and was about to throw it away, but on carefully searching for the above-mentioned vertical flash, I found its image was reversed, printing as a black flash with a white core. Subsequent observation showed other dark flashes; and the enlargement of part of the plate shows that there are indications of white cores to each of them.

Now the connection between this reversal and overexposure was very striking. Hence it occurred to me that the black flashes might be due to a sort of cumulative action. Not to the excessive brightness of the individual flashes, but rather to the ex-

cessive action produced by the superposition of the glare from an illuminated white cloud upon the normal image of the flash.

To test this I endeavored to obtain the same effect with the sparks from a small Wimshurst machine; but, under the conditions in which I worked, I could not get a longer spark than one inch.

I first photographed a series of brilliant sparks, using two large Leyden jars. These gave normal images, very dense, and shaded off at the margins, although the focus, as shown by the knobs of the machine, was good.

Next I tried less brilliant sparks from the machine with its ordinary small jars. These gave similar images, but less dense.

Then I repeated both experiments, and before developing the plates exposed them to the diffused light from a gas-flame. The brilliant sparks then yielded images which may either be called normal with a reversed margin, or reversed with a normal core. The fainter sparks were completely reversed.

One plate of bright sparks was exposed to the gas-light, so that different parts were acted upon for different times. The reversal seems to spread inwards as the exposure to diffused light is increased.

One plate of faint sparks was only half of it exposed to diffused light. The result is that on that part the sparks are reversed, while on the othey they are normal.

Finally I photographed a number of sparks in a series across the plate, and placed a sheet of white cardboard behind them to do duty for the white background of cloud. Some of the first sparks that were impressed on the plate show reversed images.

Coupling these experiments with the observations as to the overexposure of the "dark-flash" plate, and with the fact that all dark-flash plates I have seen show symptoms of considerable exposure, I submit that there is at least a good case for this theory of cumulative or repeated action producing the reversal. The partial reversal of the bright sparks seems to correspond with the bright core to some dark flashes; and the complete reversal of the less brilliant sparks to the absence of any such core from the less conspicuous portions of a dark flash.

There is certaintly one difficulty yet to be got over, and that is the crossing of a dark flash by a bright one. However, I have some experiments* in view which I hope may throw some light upon this also. In my own negative the point of crossing seems to be extra bright.

Meanwhile I must apologize to the Society for bringing forward these notes in

* Since writing the above communication I have made a number of further experiments, which I hope to describe in detail at some future time. But perhaps I may be allowed to say at once that I have succeed in imitating the phenomenon of a bright image crossing a dark one. The experiments point to the conclusion that diffused light acting upon a plate can reverse previously impressed images of electric sparks, but is powerless to affect any such impressions which may be made afterwards. Similar results are obtained whether the source of the diffused light is a gas-flame, a lamp, or a series of sparks. I do not at present offer any theoretical explanation of these facts, but they are in themselves sufficient from a meteorological point of view. "Dark" flashes of lightning have no existence in nature, but are caused by the exposure of the plate to an illuminated sky *after* the passage of the flash. This illumination may be due to subsequent flashes, the more recent of which will give normal images possibly crossing the reversed ones.

such an immature and hastily constructed condition. My excuse must be that the photographs of electric sparks were only taken the day before yesterday, and to-day's meeting is the last of the season.

A. W. CLAYDEN.

THE APPLICATION OF PHOTOGRAPHY TO SURVEYING.

SECOND PAPER.

THE instruments used in Photogrammetry are a combination of those of the engineer and the photographer, and to the principal piece of apparatus the compound name of "Phototheodolite" has been given.

The general construction of the Phototheodolite is well shown in Figs. 1 and 2, which are reproduced from Dr. Koppe's work. The camera, which is focused positively for distant objects, is swung on trunnions, in the same manner as an engineer's transit instrument, and at one end of the axis is a telescope, and at the other a graduated circle, by which the vertical angles may be read.

The camera and its adjuncts swing in a yoke mounted on a vertical axis, provided with a graduated circle for reading horizontal angles. Spirit levels, adjusting screws, and reading microscopes are also provided. In Fig. 2, the theodolite is shown with the camera removed, in which shape it is available for all the uses of an ordinary instrument, while the weight of the camera is so distributed as to insure its balance in various positions when it is suspended in the ring FF.

In the plate-holder there is a frame of metal, with notches in the edges dividing them into spaces of a centimetre in length, so that a scale is photographed on each plate, and the horizontal and vertical axes may be drawn from these divisions.

Of course the matter of portability is one of great importance in all instruments intended to be used in a rough country, and provision must also be made for changing the plates in the field.

In Fig. 3 the carrying case for the entire apparatus is shown, as well as the manner of packing the various parts. The camera and the theodolite proper are clamped to the base board BB, which may be drawn out for convenience in packing.

The doors are provided with hand holes and flexible cuffs for plate-changing, and the leather lid L straps down over the doors in order to keep the joints light tight during this operation.

The method of changing plates is well shown in Fig. 4. By raising the flaps S, S, the hands may be inserted into the flexible cuffs AA, which close light-tight around the wrists. The exposed plate *g* may then be removed from the back of the camera, as shown by the dotted lines, and the door T, of the plate box K_1 being opened, the exposed plate is slipped in, and a new one, P, taken out and put into the camera. When the plates in the box K_1 are all exposed, the box K_2 is substituted for it, and in this way the plates may readily be changed in the field, without requiring a dark tent, the sense of touch being sufficiently sensitive for all the necessary manipulations.

It is impossible for us to go into the various advantages and disadvantages of the use of the camera in topographical work, and, indeed, it is a subject which in-

FIG. 1.

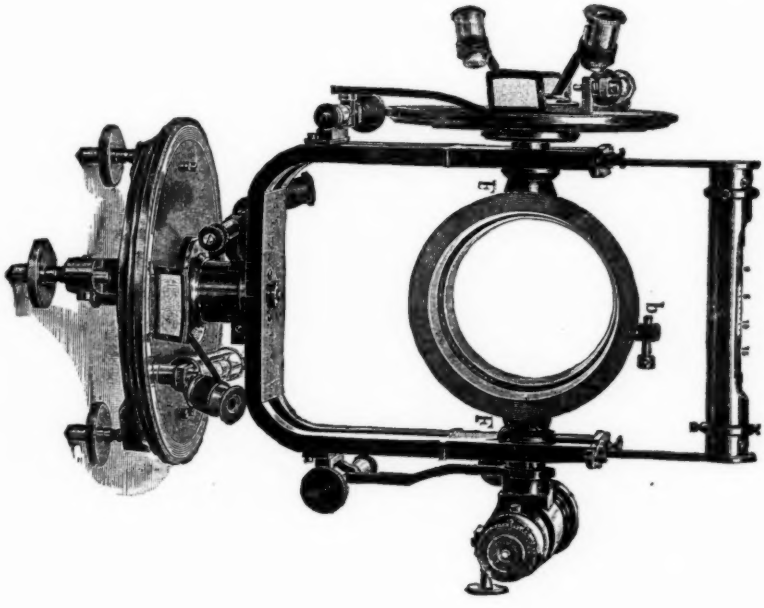

FIG. 2.

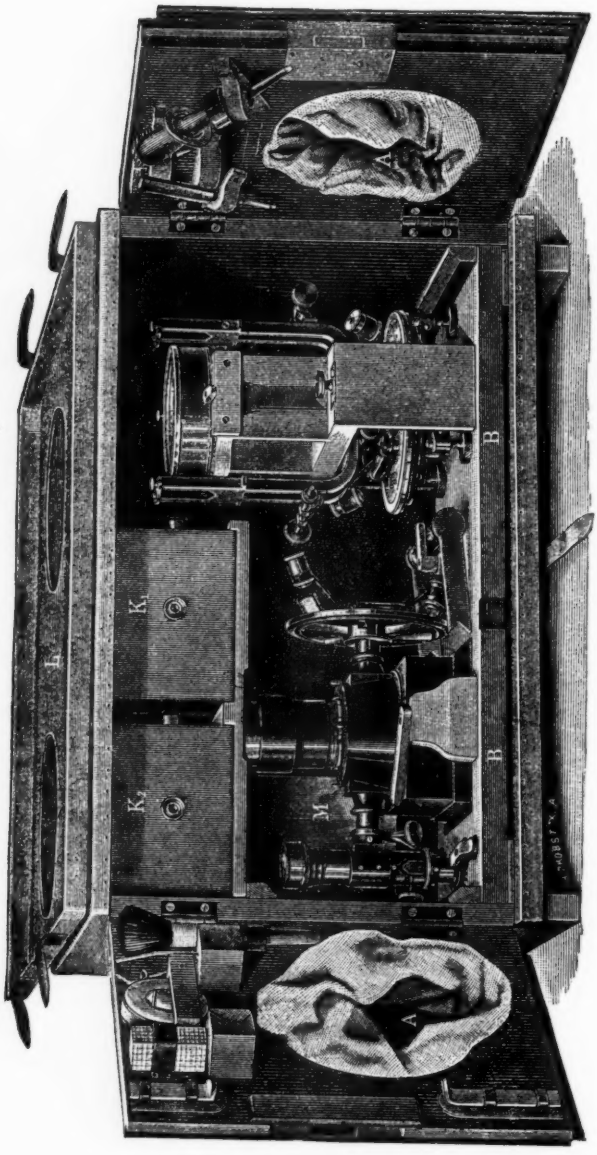

FIG. 3.

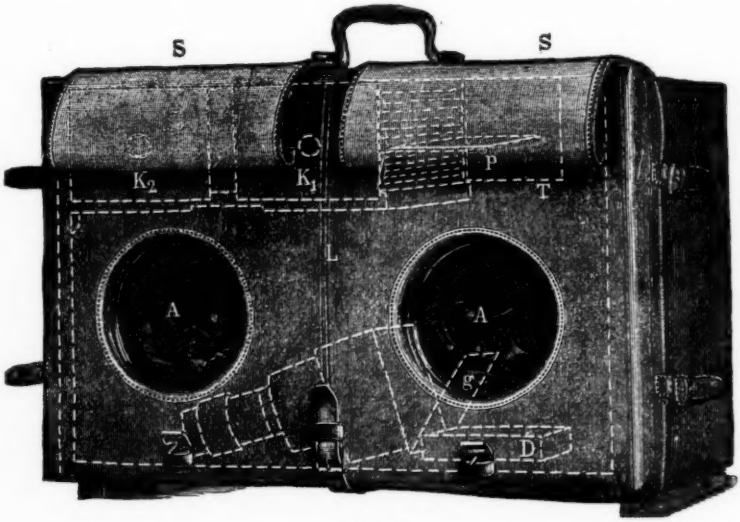

FIG. 4.

volves much careful study before any opinion of value can be given. The accuracy of the work depends much upon the truth of the lens work, and it is needless to insist upon the care with which lenses for this work must be selected. At the same time it is very probable that for preliminary surveys and reconnoissances, where much ground must be covered in a limited time at a moderate cost, the camera, in the form of the Phototheodolite, will render excellent service, and as an instrument for preliminary work it will probably find its way into the equipment of many engineering parties. For military work it possesses especial advantages, and the engineering corps of the various powers of Europe will doubtless become expert in its use before their brother civilians, and with increased experience it is quite possible that the method may develop many advantages.

—*Mechanics.*

INTERMITTENT LIGHTNING-FLASHES.

(*London Philosophical Magaziue.*)

THE storm that passed over London on the evening of June 6th afforded an unusually favorable opportunity for observation, both with and without the aid of the camera, on the character of lightning-flashes, and for determining the causes of some of the curious effects noticed by previous observers.

While watching the storm from my house in Ealing, I could in several instances distinctly perceive a flickering appearance in a discharge, and in one particular case the repetitions were at least five or six in number, just sufficiently slow for the eye to detect the variations in brightness without removing the impression of one single flash. Other observers with whom I have since spoken have informed me that they had observed a similar effect, and that in some instances flashes, following as nearly as could be seen in the same path, were separated by an appreciable interval, often of several seconds duration. Photographs of lightning have frequently been obtained showing banded, ribbon, or double flashes; but, so far as I am aware, these have not been of so decided a nature as to remove doubts whether the appearances could not be ascribed to the effects of halation by reflection from the back of the negative, or to blurring from the photograph having been taken through the glass of a window, or to some other similar cause. I was therefore anxious to obtain some decisive evidence of the repetition of the flashes, and as my friend Mr. G. J. Snelus was at my suggestion attempting to obtain some photographs of the lightning, I joined him, and he kindly placed his camera and some plates at my disposal.

The rain having ceased for the moment, I was able to go out on a balcony, and thus get a good view of the storm, which had now approached quite close and seemed to surround us. The camera was held in the hand, and pointed towards the north-east, where, about half a mile away, numerous brilliant flashes were occurring. The cap of the camera was taken off, and then the camera was moved in a horizontal plane about the lens as a centre at the rate of about once to and fro in three-quarters of a second, until a flash was observed in the direction in which it was pointed, when the cap was at once replaced. The duration of the exposure of the plate was about half a minute. The camera was of quarter-plate size, the plates were Ilford rapid, and the lens, which was a rapid rectilinear, was used with full aperture.

I hoped, by having the camera moving, to be able to separate the successive components of the flashes, and in this I was fortunately successful. In one of the photographs obtained can be seen two triple flashes and one double flash.

During the interval that the plate was exposed the illumination of the sky from flashes out of the line of view, or behind clouds, produced the glare seen in the centre and upper part of the photograph, and some faint flashes which were noticed were probably the cause of the streaks seen in Fig. 2 at *o*, *p*, and *r*.

A careful examination of the photographs reveals many interesting features. The three successive flashes I., II., III. are identical in form. If the negative be placed over a print so that either of the three lines on the negative lies over either of those on the print, the coincidence is seen to be exact even to the smallest irregularities. Nevertheless, of all the branch-flashes which spread out from I. only a small trace exists at *n* in II., and none whatever in III. Sweeping across the photograph and connecting corresponding points in the successive flashes are streaks of light, showing that a very considerable residual illumination remains between the discharges. These

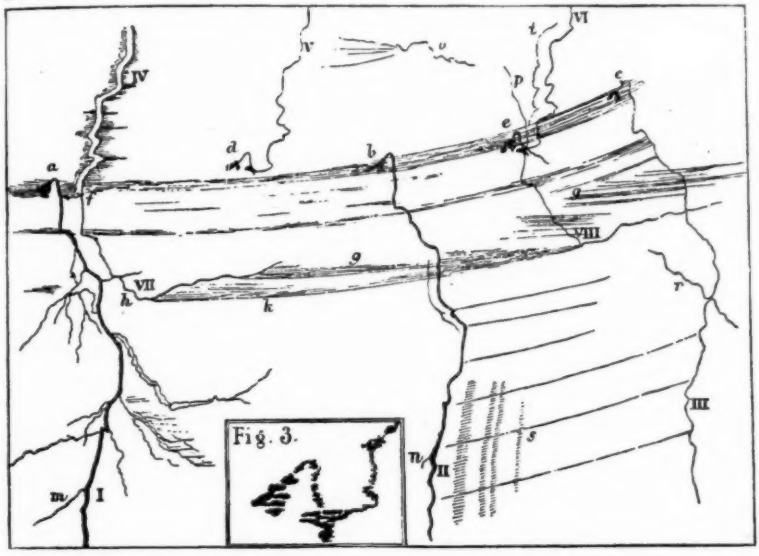

Fig. 3.

streaks are especially well marked between the components of the double flash, and are also very bright along the path of the head of flash I. They are not always present; for in another photograph obtained upon a moving plate by Mr. Snelus, in which a flash is reduplicated, there is no trace of them, the flashes being quite sharp and distinct. The streaks commence abruptly with one discharge and end abruptly with another. Their extension to the left of I. was probably due to the camera not having quite reached the end of its swing. Where they are brightest there is in all cases a swelling at the part of the flash where they start.

At the upper left-hand corner there is a curious dark flash with bright edges and short luminous streaks. The form of this dark flash is exactly reproduced in the two bright flashes. Dark flashes are frequently met with in photographs of lightning, and have been usually ascribed to reversal of the image by over-exposure; but I do not think this explanation applies in the present case, both on account of the appearance which the dark flash presents, and also because as far as I can recollect the brilliant downward flash I. appeared to the eye much the brightest of those that occurred while the plate was exposed. There is a similar but less distinct dark gap to the left; and to the right of II. are three or four faint bands parallel to it and following its sinuosities. These all seem to be due to variations in brightness in the luminous streaks, which are thus shown to be electrical and not phosphorescent in character.

When carefully compared, the forms and positions of the flashes are found to present such agreement as to show that they must have formed a system of discharges closely connected together. If V. be placed over IV. so as to coincide with its left-hand border, the portion *d* exactly coincides in form and position with the portion *a* of V. and both *a* and *d* terminate in a curious bifurcated enlargement which, when examined with a lens, shows a beaded appearance, roughly sketched in Fig. 3. This coincidence of form and position would be difficult to account for if I. and IV. were

independent flashes not occurring at the same time. It is evident, however, that the series I., II., III. cannot have occurred during the same sweep of the plate as IV., V., VI., since the curve joining *a*, *b*, *c* is concave upwards, while that of *a*, *d*, *e* is concave downwards. The flashes VII., VIII. seem also to have formed part of the same system of discharges, for the part of VII. from *f* to just above *h* is coincident with the upper portion of I., while the luminous streaks extending between VII. and VIII. agree in their directions with the curves joining *a*, *b*, *c* and *a*, *d*, *e*, those at *g* being parallel to the line joining *d* and *e*, and those at *k* following nearly but not exactly the line of *a*, *b*, *c*. There is thus afforded some clue to the determination of the order of the discharges, and I think the order was probably as follows:—VII., VIII., VI., V., IV., I., II., III., the first two occurring during one sweep of the camera; VI., V., IV. during the backward sweep; and I., II., III. in the next onward sweep. There must thus have been an interval of a little over a second between the first and last discharge, for the motion of the camera was at about the rate of three-quarters of a second for a complete swing to and fro. The interval between the successive discharges was, therefore, between the fifth and tenth of a second. Had it been much longer the flash would have presented to the eye a flickering appearance.

Whatever be the explanation of some of the effects noticed above, it is evident that a lightning flash has not the simple instantaneous character formerly supposed; but that it consists of a varying number of successive discharges following one another in the same path at intervals which may in some cases be comparatively long.

NOTE.—Since the above was written I have had an opportunity of inspecting the photographs of banded, ribbon, and curtain lightning collected by the Royal Meteorological Society. There is, I think, no doubt that the explanation of these is afforded by the multiple flashes and luminous streaks noticed above. It is noteworthy that they were always obtained with a camera held either in the hand or in such a way as to render motion probable.

H. H. HOFFERT, D.Sc., A.R.S.M.,
Demonstrator of Physics at the Normal School of Science and Royal School of Mines.

BOSTON CONVENTION OF P. A. OF A.

THURSDAY, AUGUST 8, 1889.

FOURTH SESSION, 11 A.M.

PRESIDENT MCMICHAEL: Before commencing business, Mr. Hastings will distribute some envelopes amongst the members for the purpose of allowing each of you to contribute a dollar toward the Daguerre fund. (Envelopes distributed.) The first order of business this morning will be the reading of communications. I have the following:

BOSTON, August 6, 1889.

Gentlemen of the Convention:

The Boston and New England Photographers cordially invite you to attend the reception and harbor excursion that occurs on Saturday next, 10th instant. The magnificent steamer *New York* has been specially chartered, and leaves Battery Wharf at 9.30 A. M. A trip, passing all of most noted points of interest in Boston Harbor, has been arranged. Dinner and other refreshments will be served on board the steamer. No expense whatever is attached to this trip, and it is our earnest wish that as many as possible, with their wives included, shall accompany us and have a pleasant trip. Please make application to the President of the Convention at once for tickets, in order that the Reception Committee may know for how many to provide meals, etc.

Fraternally Yours,

J. WILTON HALL,
G. WALDON SMITH,
JOHN STALKER,
WM. H. PARTRIDGE,
C. F. COULY,
W. A. FRENCH,
W. A. WEBSTER,
Reception Committee.

The motion was then carried that in acknowledgment of the kindness of the photographers of Boston in extending an invitation to this beautiful trip, the unanimous thanks of the fraternity be tendered.

The following communication was read:

CINCINNATI, OHIO, August 7, 1889.

H. MCMICHAEL, President Photographers' Association of America:

I congratulate you all on our half-century birthday, regretting that I cannot join you in the feast. I am always with you in heart.

Fraternally,

J. LANDY.

SECRETARY SCOTT: We are ready to report the Anthony Bromide Paper awards, and if you wish to hear them, I will read them.

Award of Prizes for Pictures made on Anthony's Reliable Bromide Paper.

We have decided to award the prize for plain enlargements to the exhibit marked with a star, and the prize for work on enlargements to the exhibit marked "Vindex."

F. W. GUERIN,
JOHN BARTLETT,
C. H. DAVIS,
Judges.

Star exhibit, by A. A. Knox, New York.

"Vindex," by G. H. Croughton, Rochester.

PRES. MCMICHAEL: Unfinished business is now in order.

MR. CLINE, of Boston: I would like to repeat my motion of yesterday, which was out of order, that the Association appropriate the sum of one thousand dollars toward a Daguerre testimonial or monument. There is a $3000 surplus, I understand, in the Treasury. I do not think we could put it to any better use. (Motion seconded.)

MR. ELIOT: I have no wish to object to any appropriation of money of that kind. But I think we want a popular movement in this, in which the small will feel as big as the large man, in which a man who has got only a hundred dollars will feel just as good as if he had a thousand. I move that every man put one dollar in and no more. (Applause, and a voice, "That is right.")

MR. CLINE: I did not intend to shut off those men that want to pay a dollar. I am willing to do that myself. But I wish to give the thing a national significance. It would look as if we had thought something of the matter. And, this being a semi-centennial celebration of the discovery of photography by Daguerre, I thought it was proper that this Association should contribute as an association, and then subscriptions could be taken afterward.

MR. CARBUTT: I think, to make this thing popular and national, every man should feel that his contribution is needed, and should consider it a privilege to subscribe. I think if the executive committee of the Association would issue a circular to all the photographers of the country, asking their contribution to this general fund, it would be a very excellent thing. (Applause.)

A MEMBER: Offer it as an amendment?

MR. CARBUTT: I do not feel that it ought to be offered as an amendment. I think the Association should do something, and that the photographers of the country ought to have the privileges also. I think this monument should be something that we can all point to in coming ages as coming from an association of very liberal representation in this country. I think, now that we have a surplus in the treasury-a reasonable amount—I am not in favor of a thousand dollars, but I think that probably five hundred might be appropriated from the treasury and come in at the latter end, and that the photographers of the country be allowed the privilege of contributing their one dollar each. I think a very handsome subscription could be raised, if circulars were sent by the Executive Committee of the National Photographers' Association.

MR. CLINE: I would accept that amendment of five hundred dollars if that would help the matter.

MR. RANGER: I think it is bad policy for us, at the beginning of this movement, to appropriate money from this treasury for the monument. I think it is better to get our subscriptions first. That will take some time. Then, if it is necessary to have a little supplement, it will be proper to appropriate a sum of money from the treasury of this Association.

MR. CARBUTT: I will offer this amendment, that a circular be issued to the photographers of the United States by the Executive Committee of the National Photographers' Association, asking them to contribute one dollar each, and that the contri-

bution from the treasury of the National Photographers' Association be postponed until our next annual meeting.

DR. ELIOT here withdrew his amendment.

MR. CRAMER: I am very glad to see this motion before the house. I think that all the members of our profession ought to hold Daguerre in high honor. There is nothing more proper than that our Association should do something to honor him. And it is a good idea to give a large number of our fraternity a chance to contribute. And it will be better to attend to that first. That will take at least a year. And there will be others that will be ready to contribute if the fund should not be sufficient.

PRESIDENT MCMICHAEL: You have heard the motion as stated by Mr. Carbutt. Are you ready for the question? (Motion carried.)

MR. BURBANK: I would like to ask if contributions for the Daguerre fund will be acceptable from the amateur photographers of the country?

PRESIDENT MCMICHAEL: I presume they are acceptable from anybody.

MR. RYDER: As the maker of the original motion, I have in view that this should be open to everybody—to the amateur, to the admirer of the art, to everybody who is interested in the art and its discovery. I should not consider it good policy to debar anybody who is willing to contribute.

MR. RYDER: My idea in starting this movement was to erect a monument to the discoverer—the original discoverer of photography. There are many men to whom we owe for more recent discoveries, but my idea pointed to the original one. I feel a conviction that we had better not embody too much. These others we can remember at another time. I think that we may be detracting from the object a little in taking anyone else into it. That is my idea. (Applause.)

DR. ELIOT: I am still thinking of the location of this monument. I had that thought yesterday, and I have it still to day, I cannot get it out of my mind. I want to make a suggestion about the location of this monument. My idea is, to put the monument in the Smithsonian Institution, in Washington. That is a representative institution of the inventions of this country, and I think it will be a good place for this monument. It is at the national capital, and it is not in any State. (Applause.) I make that as a suggestion only. I think it a good plan to settle the matter now, and thus leave the Executive Committee without the embarrassment of the question as to where it shall be put. I can assure you from having been on committees of this kind that it is a very difficult matter to settle. I have found it so many times, and those of you who have served on committees of this character will understand the difficulty of the question coming up as to what we shall do with it. If we put it in one place, it will excite the jealousy of the people of another place. Washington is not in any State in the Union. It is the the Capital of the country. And the Smithsonian Institution is a representative institution of the inventions and genius of this country, containing everything of interest in respect to inventions and science. I think that would be a good place for it. I make it as a motion.

(Motion seconded and unanimously carried.)

PRESIDENT MCMICHAEL: Is there any more new business to come before the Association?

MR. HINES: I would like to call the attention of the Convention to the proposed

World's Fair in 1892. I think the Association should take immediate steps to be represented on the New York Committee. I know that it is two or three years off, but it takes some time to make the preparations, and I guess this is a proper time now to speak of it.

DR. ELIOT: Now, gentlemen, the question comes, How is the Committee to be appointed? I move that the President of this Association appoint the members of that Committee.

PRESIDENT MCMICHAEL: I will make the report on this to-morrow morning. Is there any more new business before the house?

MR. GENTILE: We have among us the officers of a new Association, an Association that proposes to bestow a great benefit upon the photographic fraternity. They undertake to tackle a question that this Association has not been able to touch. I think it would be appropriate to call on their representative men to give us some enlightment. I think it is a matter that would interest us all. We have already taken a deep interest in it. I think it would be a pity to allow this convention to go by without calling upon these gentlemen to express their views in the matter. Therefore, I make a motion that we call on Mr. Bogardus, the President of that Association.

FIFTH SESSION.

The fifth (evening) session was opened by the reading of Mr. Croughton's paper, which was followed by a few remarks from Mr. Ames, of Glen Falls, New York, on Silver Saving.

MR. AMES'S REMARKS.

Mr. President, Ladies and Gentlemen:

I am very glad of this privilege of standing before you, and looking you in the face to-night. I am well-known to a very large portion of the photographic fraternity personally; to many more by reputation. Yet I see many in this Association whose faces I never looked into before.

I wish to ask a few questions, which I will answer. Why are you photographers? Why are others attorneys-at-law? Why are others doctors of divinity, and others doctors of physic? Why are some mechanics, some farmers, some others, some laborers? That they may all get money, that they may get their bread and butter. And that is the ultimatum of the convention here in session in Boston. It is to ascertain how you may better understand your work, how you may improve your work, and how you may gain better results, that you may get your share of the custom and get better prices, and give satisfaction to your customers.

Now what I want to do is this: I want to give you a little hint, not how to make money, but how to save money. There are a great many photographers who are very eager to make it. They are very careful to save every scrap of paper waste, and yet they throw seventy-five per cent. of all their waste away thinking that the most of their waste, or the value of it, lies in the paper clippings only. When you silver a sheet of albumen, let me ask you what portion of that paper goes upon the card? The greater part of it. It is only the small trimmings around the outside that do not. And, to my astonishment, I have found photographer after photographer who did not stop to think that all the paper that went upon the cards, all the paper

that was mounted upon the cards, contain silver. They wash it out, put it through a hypo solution, and throw it all away. Others attempt to save it, and, for lack of knowledge, do not save it. Now I have said that each one chooses his own vocation in life for the purpose of making money. Now, if you set out in a certain direction in life to earn a livelihood, whatever direction that may be; if you are a photographer, be the best photographer that you possibly can. If you are an attorney-at-law, be the best pleader at the bar that you can possibly be, and do the very best for your client. If you are a farmer study to be the most skilful farmer. And just so in everything, even down to the common laborer. Study to be the very best, and to give the very best satisfaction. Now to be good photographers requires knowledge, knowledge. There has been a great advance in photography since the art was discovered, since the first picture was taken upon a metallic plate fifty years ago. And I have thought that if there could be an exhibit of every photographer's work from the beginning of his business, back years ago, placed side by side, and put in year after year among the exhibitions in the hall, we would have a chance to see what an advance has been made. Yet it has been stated here to-day by Mr. Bogardus that you are descending, going down hill. In some respects that is true, but as far as the work of photographers is concerned, they are making advances every year. And now in the year to come, if photography is to make rapid progress you ought to begin to educate those who enter into the study of the art, in the study of chemistry. How many photographers, if I was to call upon you to-night to hold up your hands, could say that you are chemists even in the branch in which you are engaged? I know that to say that a man is a chemist is to use a broad term, for chemistry is a broad study. It covers the whole creation of God. It reaches from the bowels of the earth to the most distant star. The growth of a man is a chemical process. The growth of a tree is a chemical process. And when you will show me a man who is a perfect chemist and who has a knowledge of chemistry to its utmost bounds, I will show you a God. But every man may understand chemistry, and be proficient in it in the branch in which he is engaged.

And now I want to talk a little of the chemistry of the metals which it is necessary for a photographer to understand, even in the saving of his waste. God has stored all of the material that is necessary to enter into the photographic art in the earth and in the sun-beams. And now to be a good photographer, to understand the art, you want to know how to put a harness upon these agencies, so that you may handle them to perfection.

There are others who perhaps want to say something here to-night, so I will enter at once upon the saving of waste, without any more preliminary remarks. You might think, perhaps, that it was unnecessary to say anything regarding paper waste. Almost anybody can save that. They can throw it aside in a box or bag, or any place they choose to save it. But yet it is necessary to give a few additional hints about saving paper waste. A great many get the idea that it does not make any difference, so long as it has got to pass through a refining process; they think everything can go in with it, all the trash and all the dirt that is swept from the floor can go into the same box. That is a grand mistake. It is mixing up a great deal of foreign matter, and it increases the cost of refining, and thus lessens your returns. Therefore, keep the paper waste just as clean and just as free from all foreign matter and

from anything that has no silver in it, as you can possibly keep it. Others get the idea that blotters are very rich. Sometimes they are. I have had blotters that would yield an ounce of metallic silver to a pound. And I receive more blotters to-day that are not worth fifteen cents per pound than I do that are worth more than that. Photographers ask why a blotter cannot contain more silver than albumen paper. Now, many times, if you take it according to the surface, the same surface upon the blotter as upon the albumen, you will find more silver in the blotter than in the albumen. But when you put them in the scales, and put in enough albumen paper to balance your blotters, you have got nowhere the per cent. of silver in the blotters by the pound, that you have in the albumen. We will take the habits of two different photographers. We will say that I am called, for instance, to illustrate, by two different galleries. The two photographers have the same general habits, except that one believes this, and the other does not. The one has ten pounds of albumen scraps. The other has exactly ten pounds, both silver of the same strength. One has five pounds of blotters. Now in that fifteen pounds of waste, five of blotters and ten of scraps, he has no more silver than the other photographer who had ten pounds of scraps alone. And yet he would be astonished if he found that his neighbor got just as large returns as he. It has taken fifteen pounds to distribute the same amount of silver that the other man had distributed through his ten pounds. This is enough, perhaps, upon paper waste.

Take the washings. Some throw them away entirely. They will attempt to save them, but do not succeed. They will save the first washings and the second, and some of them will save the third. When they come to putting in the reagent, salt is a proper thing to use under some circumstances, but I do not consider it proper in print washes. Salt is a reagent. It is a proper agent to throw down the old bath. Print washings are so exceedingly weak that it is almost like taking a grain and putting it in an ocean of water. When you get it so exceedingly weak as it will be in print washings, where water after water is added, and the chloride is not sufficient to settle it, it stands milky for a long time. I advise putting the print washings and the hypo-fixing solution together. A great many get the idea that it is all in the print washings. Now, if you understand chemistry properly you know that chloride of silver is not soluble in water, but is soluble in hypo-sulphite of soda, soluble in ammonia, and in cyanide of potassium. If you put them together, you increase the strength of the solution. Then use sulphuret of potassium. Now as to the amount to use. If you should ask me how much to use I should say, "Give me the exact amount of nitrate of silver that you have in the barrel, and I will tell you how much of the reagent to use." You will say, of course, that you cannot do this. You have to get at it by experience. If you have a barrel full, the better way is to precipitate it as it is added, day by day, adding a little of the reagent. Dissolve your sulphuret of potassium, and keep it well corrected. For instance, supposing you have a pint bottle full of it, and you have a barrel half full of the solution, pour in, for instance, a teacupful. Stir it up. It will all turn black. It forms the sulphite of silver. Then it clears up, and the photographer thinks his silver is all down. To illustrate this. Suppose we take two ounces of nitrate of silver and dissolve it in water. Now we will use salt. We will put in just enough to precipitate one ounce, and we shall have changed one ounce of nitrate of silver solution into chloride of silver. The

rest remains perfectly clear. Many photographers will decant that and throw the other away. The right way is, when it clears up, to drop in a drop or two of the reagent, and so work on carefully. In the use of salt be careful not to use an excess, as chloride of silver is to some extent soluble in an excess of the reagent.

Regarding developer waste it is not necessary to say much about that. There are hardly any galleries at the present time where there is any developer waste to speak of. There is no developing in the dry plate; the dry plate developer is not worth anything. There is no silver that goes to waste in developing the dry plate. But in case anyone should have any developer, I will say that I know of one refiner in the West, in one of our western cities, who says in one of his advertising circulars that after you have precipitated your solution of hypo and washings, mixed as I have been telling you, if it does not clear up exactly, put in a solution of sulphite of iron. That man does not understand chemistry, or he is trying to mislead. Sulphide of iron is formed, which will look just like sulphide of silver to one who is not accustomed to it, so that he would not be able to tell the difference between the two. Therefore you have a large per cent. of sulphide of iron mixed with the sulphide of silver. In this case, if you have iron in your hypo, and you precipitate with sulphuret of potassium, just as long as that iron is in there you will be forming a precipitate again. So you do not want to add any iron where you use sulphuret of potash. In regard to the clearing up of solutions, many complain because their hypo, when they use sulphuret, has color upon it. That color may be due to a great many causes. The barrel may have been used before. It may have been used for saving silver, so that the staves have taken something that gives color to the solution, and it will continue to do so as long as you use the barrel. But there is this to say about that color. When you have precipitated your silver with sulphuret of potash, and it clears up, but still has color, you want to dip out a little into a clear glass or bottle or anything you can look through. Now, into this drop one, two, three, or four drops, and then watch for the effect. Now, if it barely makes a color and there is no precipitate, no substance gathered, nothing that trickles down to the bottom, no sediment that goes to the bottom, then no matter about the color, pay no attention to it. But if you have silver there it will go trickling down in little particles of the sulphite of silver. So test your solutions by dropping in a drop of the sulphuret that you use, and in a little while you will be able to tell, by your own experience, how much you want to use to precipitate the barrel. Now, sometimes, in adding sulphuret, instead of turning black it will turn white. This is due to different causes. If there is acid present in your hypo which is not neutralized by your hypo, the sulphuret neutralizes it, and that liberates the sulphur from the sulphuret, in which case you would have some of that white milky streak and still get a precipitation. But if you get a precipitation and then continue to add the reagent, as soon as you begin to have that milky white appearance, that shows that you are now getting an excess of the reagent, and that is due to the liberation of sulphur. A great many object to the use of sulphuret of potash. It is the most powerful reagent used, and if you will use it right and carefully every time, allowing this waste agent to be in the hands of experienced men, there will be no difficulty. Let some one man take care of it. Do not let it be the duty of Mr. A, B, and C to attend to it. It should be one man's business, and he should be a man who has studied the business, just as much as the

man who does your posing has studied that, just as much as the man who does your manipulation has studied that. The saving of waste in a gallery is a science, and you want to begin training even yourself or some of your help in that science. Let them have sufficient knowledge of chemistry to know the result of this and that. Now the old barrels, many times, after they have been used for a long time and have been standing full of this silver waste without being precipitated, sometimes contain a great deal of silver, I have obtained as high as twenty-five or thirty dollars from barrel staves, and I have had them not worth a cent. It is better to keep the toning solutions separate and precipitate them with the sulphite of iron. Always acidify them. It is well to use sulphuric acid,—just enough to acidify it, and that is all,—and then your gold will go down. Test it in the same way as silver, with sulphuret of potash. If it clears up, drop in a little, and, if there is no dark color, your gold is all down.

With regard to emulsion, I do not know whether it is of any use to talk to photographers regarding that. They do not have enough to make it any object to bother with it. And as far as the dry-plate manufacturers are concerned, they have very thorough knowledge of it now. I am refining it for all the leading dry-plate men in the country, as Mr. Cramer can testify. But I might say, regarding the bromide of silver, to destroy your gelatine if you want to precipitate it into a bromide; either use concentrated potash or concentrated lye in sufficient quantity, and boil the solution until it is thoroughly cooked, when, in due time, it will all settle and become perfectly limpid and clear as water, or you can precipitate it by heating and using sulphuric acid or hydrochloric acid in sufficient amount to destroy the gelatine, and the bromide of silver will settle.

Now, regarding the nitrate of silver, I want to give you something which you will remember and carry with you. I want to give you some tests for the purity of nitrate of silver. A great many photographers, if they get hold of a new brand of silver, and get in any bad luck, are sure to locate it upon the silver. I want to show you how far imagination will go. A photographer in Cooperstown, N. Y., had occasion to go to a drug store to get some nitrate of silver. He purchased 4 oz.; it was my own manufacture of silver. It had gone into the drug store there from a wholesale drug store in New York. He knew nothing of the make of the silver, and objected to it some, but the clerk assured him it was all right, as he was very familiar with the silver. The photographer took the silver, tried it, brought it back, and said he could not use it. He said, "Give me Powers & Weightman's." The clerk took down another bottle of my own manufacture and gave it to him. The next time he met him he asked him for a report of it, and he said it was all right, that the silver was just what it ought to be. It was the same brand exactly, manufactured by the same man. In the city of San Francisco I found the photographers prejudiced in this way. They will use no man's make of silver but Mr. Rosencranz's, of Philadelphia. He makes excellent silver; Powers & Weightman make good silver, and I could name some others. You can use the silver of any reliable manufacturer. You can use it all. But when something gets to going wrong, do not lay it to the silver. Now, I will warrant my silver to be chemically pure. I warrant it in this way, that you take the original crystal. When you get a new brand, save back a little of the original crystal. Then, if you have bad luck, do not go to falling upon the solution

you have made, do not put that into the hands of a chemist, who will report it wrong because there was something wrong in the water or the dish. But when you take the original crystal, I will guarantee it chemically pure. After you have dissolved it I would not warrant it at all. Powers & Weightman once told me that they had a saucy letter from a photographer who condemned their silver. They wrote back to him that their silver was all right; but he thought he knew better than they did. After a while they got a letter of apology from him, stating that he had been analyzing, and had discovered that he had hypo in his water. Now, I do not warrant my silver mixed with hypo or cyanide of potassium. Now, silver comes in contact with a great many different things that would upset the whole thing. It may be in the dish. It may be in the water. It may be in the atmosphere. It may be in the atmospheric conditions of your room. Your coal stove may leak gas which comes in contact with the silver. You know what an affinity silver has for sulphur. Take a piece of metallic silver, as bright as silver can be, and put it in your pocket, and put matches in the same pocket, and it will become black. Put it in your pocket without matches, and, in warm weather, the sulphur of the body will turn it black. Silver will be turned black by the perspiration of the body. I used to manufacture sulphuretted hydrogen, and if it got on to dishes that had not been washed from nitrate of silver, it would be as black as your hat. Let a room be full of turpentine fumes, and you will get, to some extent, the same effect. You want to study, so that you may know what these causes are, and not fall upon the silver. It is not one time in 100 that you can locate it upon the silver. Sometimes there may be something upon the albumen paper. The condition of that may be such that it works badly.

Now for the test. I was going to give you a test for testing the purity of silver. Many people mistrust that it is adulterated with nitrate of potash. But it is one of the greatest wonders that, with the present prices of silver, it is not largely adulterated with some foreign nitrates, when silver has to be manufactured for less than a cent an ounce above the cost of manufacture. But if there should be any of these foreign nitrates in the silver, such as nitrate of potash, of soda, or of ammonia, the test for that would be what I will give you, one which any photographer could very well go through with without any trouble. Just take a few grains of the silver, very fine, break them up fine, and make a little pile upon filter paper ½ inch long or so. Roll that piece of filter paper over it and begin to twist it. Twist it all up as hard as you can without breaking the paper, and then touch a match to the end of that piece of paper, and the burning of that piece of paper will metalize that silver. It decomposes it and throws off the nitrogen, and you have a pure wire of metallic silver. Blow the ashes from the paper all off from that piece of silver and put it in your mouth. If nitrate of potash is there, you will detect it very quickly. If the silver is pure, there will be nothing but the pure metal, and there will be no more effect than there would be in putting a clean ten-cent piece in your mouth. You may get a caustic, burning taste which will be due to the nitrate of silver. But if it is thoroughly changed you will have no disagreeable taste. But if there is nitrate of potash there, you will observe it very quickly. This does not burn up. It is fusible, so it would be upon the surface of the silver, and you will detect it by the taste.

I do not know that I have anything more to offer upon silver. A great deal more could be said upon the subject, but it is not worth while for me to say anything

more than I have. I could say enough, or write enough, to make a large book. I have some more of these small manuals, giving directions for saving waste, which I distributed the other evening, which just give general hints. They do not go into the details as much as I have done to-night. I thank you for your kind attention. (Applause.)

MR. SCOTT: I move that we tender Mr. Ames a vote of thanks for his able speech to-night.

Motion seconded and unanimously carried.

A vote of thanks was also tendered to Mr. Croughton for his excellent paper.

THE PRESIDENT: Mr. Milburn is about to give us a demonstration of the Eastman transparent film, and he will have to do it in the dark; so we will have to turn out the gas.

Mr. Milburn then gave his demonstration, after which the Convention adjourned to 10 A. M. the following morning.

LIST OF BOSTON CONVENTION AWARDS.

EVANGELINE—J. Rosch & Co., St. Louis, Mo.

CLASS A.—G. M. Elton, gold medal; Rosch & Bro., gold medal; O. P. Scott, gold medal; S. L. Stein, gold medal.

CLASS B.—Baker Art Company, gold medal; Stuber & Bro., gold medal; S. J. Dix, silver medal; Doerr, silver medal; D. R. Coover, bronze medal; E. F. Hall, bronze medal; Hardy, bronze medal.

CLASS C—*Landscapes.*—Baker, gold medal; Jackson, silver medal; W. A. French, bronze medal.

CLASS C—*Architectural.*—Bowersox, silver medal.

CLASS C—*Marine.*—Peabody, silver medal.

CLASS D—*Retouching.*—A. V. Cunningham, silver medal; Theo. Henry, bronze medal.

CLASS E—*Enlargements.*—Eastman Dry Plate & Film Co., silver medal.

CLASS F—*Best substitute for glass.*—Eastman Dry Plate & Film Co., silver medal.

CLASS F—*Improvements in apparatus.*—Scovill & Adams Co., bronze medal.

CLASS G—*Foreign pictures.*—F. Müller, Munich, Germany, gold medal; Mendelssohn, London, England, silver medal.

Most artistically arranged display, Diploma.

The Eastman Dry Plate & Film Co.'s Grand Prize to E. Decker, Cleveland, O.

LITERARY AND BUSINESS NOTES.

OPEN LETTER.

ROTHENGATTER & DILLON,
912 ARCH STREET.
PHILADELPHIA, Sept. 1st, 1889.

Editor THE AMERICAN JOURNAL OF PHOTOGRAPHY.

DEAR SIR: We desire to have called to the attention of your readers among the P. A. of A. that the award announced at the Boston Convention, giving the "Eastman cup" for the best collection of bromide enlargements to Mr. E. Decker, was the result of a series of careless mistakes. The judges appointed for the class were Mr. John Bartlett, of Philadelphia; Mr. M. L. Hatton, Vincennes, Ind., and Mr. Glines, of Boston, the first two of whom awarded us the prize, Mr. Glines voting for Mr. Decker. When the awards were read, Mr. Decker's name was called as winner of the Eastman cup, and it was immediately handed over to him. It happened that none of the judges were in the hall at the time the announcements were made, and it was not until that evening (Friday) that they discovered the injustice that was done our firm, when they at once started upon an investigation. Upon the production of the ballots cast, there was found among them one signed by Mr. Dixon, of Toronto. This man had no right whatever to vote in the matter, and the officers of the association and the representatives of the Eastman Company say that they had so much to do "that they did not notice this mistake." And *the ballot handed in by Mr. Bartlett was missing*. Now, the two questions arose, "What had become of Mr. Bartlett's vote?" and "How did Mr. Dixon come to vote at all?" The first question was answered, we are told, by Sec'y O. P. Scott, that "Mr. Bartlett had handed in his ballot in an envelope not properly gummed, and *that it had been destroyed on account of informality*." Just consider this hair-splitting formality, that throws out the vote of a duly accredited judge *because it was not gummed*, and admits the vote of a man who had no more right to vote on the matter than the bootblack at the corner. And further, on the question of "formality." The judges were not supplied with any printed forms whatever, either of instruction or on which to write their decisions. Each man wrote his award on any scrap of paper picked up from the floor (some that we have since seen would amaze you), and found envelopes in which to place it (if he could).

Mr. Bartlett informs us that he handed the envelope containing his vote to the Secretary, Mr. O. P. Scott, and that nothing was said to him about the envelope not being sealed. As to how Mr. Dixon came to enter a vote, we are informed that Mr. Milburn, of the Eastman Company, appointed, as he thought he had a right to, three judges; among these was Mr. Dixon. Later in the day he (Mr. Milburn) was told by the officers of the association that the judges must be chosen according to the rules governing the other classes, whereupon he, through his assistant, Mr. Jones, informed these three men that they were not to serve, as other judges had been chosen.

Notwithstanding this notice, Mr. Dixon persisted in giving in his opinion in the matter in the shape of a vote for Mr. Decker, and in the absence of the knowledge of the Secretary as to who were the judges, his vote was counted, instead of Mr. Bartlett's, which had been destroyed. This is how Mr. Decker comes to have possession of the "cup."

As to the above being the facts in the case, we must call upon you, Mr. Editor, to verify, and for the benefit of your more distant readers, Mr. W. Stuber, Louisville, Ky., Mr. M. L. Hatton, Vincennes, Ind., and doubtless many other members who were present during the last days of the convention, will testify to their correctness.

Now, if there is any sense of equity in the P. A. of A., we purpose having the records of the convention changed, and the award given to our firm, as determined by the judges appointed by the convention, a determination in which we think we will be backed by every upright member of the association.

Yours very respectfully,
ROTHENGATTER & DILLON.

[The facts as stated in the above letter are altogether true. Mr. Hatton, Mr. Glines and myself were appointed to judge of the merits of the exhibits displayed for competition for the Eastman prize.

Mr. Hatton and myself decided in favor of the exhibit of Messrs. Rothengatter & Dillon; Mr. Glines cast his ballot in favor of Mr. Decker, of Cleveland.

The judges, on being informed of the announcement that the award had been given to Mr. Decker, and not to Messrs. Rothengatter & Dillon, at once sought an investigation, the representatives of the Eastman Company

being as zealous in their endeavors to secure justice as were the judges themselves. An appeal was made to the officers of the P. A. of A., but it was met by a refusal, on the ground that the administration had no responsibility in the matter of private awards. Further investigation revealed the fact that Mr. Dixon, of Toronto, in the persistent belief that he had been appointed a judge, had cast a ballot in favor of Mr. Decker, which ballot was substituted for the one signed John Bartlett.

The question which demands an answer is: By what means, and by whose authority was the substitution made, and by what right was the discrimination exercised? If the complication resulted from a mere misunderstanding, four ballots, instead of three, should have been found on opening the envelope, a discovery which would have at once called for an investigation.

The plea of the administration of the P. A. of A., to escape responsibility, does not excuse their inaction, inasmuch as the competitors for the prizes, as well as the awarder of the prize (though a private corporation), are all members of the association over which the administration is supposed to exercise justice.

We believe that simple justice to Messrs. Rothengatter & Dillon, of Philadelphia, to whom alone the prize belongs, demands that the facts in the matter should thus be made known.—JOHN BARTLETT.]

THE PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

THE AMERICAN LANTERN SLIDE INTERCHANGE.

Philadelphia, Sept. 3, 1889.

THE Executive Committee of the Interchange has called upon the Society for its quota of one hundred slides for the coming season of 1889–90. The Society last year had the credit of having the greatest number of slides accepted for the Interchange, and the earnest co-operation of every member is desired that this position may be maintained. It is important that as many members as possible shall be represented, so as to illustrate the photographic work of many of the members rather than of the few.

Members are requested to send slides for selection to the Director not later than October 1st, in order that they may be examined and shipped in time for the meeting of the Executive Committee.

In the circular letter sent to all the Societies the Executive Committee say:

"It is advisable to prevent a repetition of similar subjects, unless it should be necessary for purposes of illustration. Care should be taken to see that each side is properly matted, centered, and labeled, in accordance with the rules. The descriptive label should be on the right hand of the cover glass and the thumb label on the lower left hand corner of the same, as you look at the picture in its natural position.

"In selecting subjects for a set of slides it is desirable that they embrace original figure compositions, views of local or natural scenery, interesting historical subjects, foreign scenery, flowers, animals, marine views, specially artistic views, and character studies. The Committee requests that no copies of paintings or reproductions be submitted.

"Amusing pictures appearing occasionally in an exhibition enliven it and afford a pleasant relief to those of a more serious nature. Therefore it is hoped some particularly good character studies can be obtained."

WILLIAM H. RAU, *Director*,
1324 Chestnut Street.

OUR ILLUSTRATION.—The series of pictures which we present to our readers this month, representing life at the seashore, would be attractive at any time, but just now especially so by reason of the great interest excited in consequence of the devastation caused by the wind and wave on these very spots which our photographs so graphically depict. We are indebted to Mr. William H. Rau, of this city, for the loan of this excellent set of negatives.

BY reason of the quantity of matter pressed upon us this month we are compelled to defer to next month our further criticism of the work exhibited at the Boston Convention.

IN our notice (last number) of the exhibit made at the Boston Convention by the E. & H. T. Anthony Co., of New York, we omitted to mention the number of articles new to photographers made by them. We append a list of some of these:

Cameras, Normandie Reversible Backs.
" Front Focus Novelettes.
" " " Victor.
" Lilliput.
" Neg. Racks.
" Printing Frame.
Adjustable Neg. Washing Racks.
Coe's " " "
Metal Film Kits.
Celluloid Films.

Celluloid Negatives, View and Portrait.
Aristotype Paper.
Pizzighelli Paper.
Farnham Rubber Trimmers.
Economy Rubber Trays.
Papier Maché "
Bromide Easels.
Mize Magnesium Flash Lamps.
Allderige Print Register.
" " Mounters.
" Adjustable Clips.
Phantom Tripods.

These articles were exhibited at the Convention of the P. A. of A., in Boston, and not placed in competition for prizes.

WE also neglected the superb collection of finished work on bromide prints, exhibited by Mr. Geo. H. Croughton, of Rochester, N. Y.

Examples of both plain and colored work were shown, which were pervaded by a wealth of soft, warm tones, and a delicacy in gradations of light and shade, and a harmony in the association of tints of color which gives evidence of a true feeling for art, and a knowledge of the principles which govern it.

Mr. Croughton, we learn, is not only a photographer, but also a painter, having studied in England in the Royal Academy, which fact accounts for the exercise of so much taste in his work.

The prize offered by the E. & H. T. Anthony Co. for the best finished work on their bromide paper, it is almost needless to say, was given to Mr. Croughton by the judges appointed to decide.

A NEW photographic society has been formed at Pottsville, Pa., which is given the name of Schuylkill Camera Club. The officers are: President, George M. Bretz; Vice-President, E. H. Davis; Treasurer, B. F. Patterson; Secretary, Jay G. Shumway.

The object of the Society, as set forth in the Constitution, is to afford opportunity for exchange of photographic experience. Public exhibitions of the work of the members are to be given at least once a year.

We welcome this new Society, and are assured of its long continuauce under the management of such able officers and experienced photographers. We expect to see much good work represented by the club at the next annual Joint Exhibition at New York.

SEPTEMBER BARGAIN LIST.

Accessories:

1—No. 4 Queen & Co.'s Lancaster Acme Microscope, with one eye piece and one 1-in. objective, in walnut case, (cost, new, $36.00), ... 18 00
1—9x11 Glass Bath and Dipper . 1 80
1—Packard Rock 3 00
1—8x11 Exterior Background, light right 8 00
1—Card size Burnisher 3 00
1—Cameo Press 1 00
1—Rustic Wood Chair 5 00
1 copy Photo Mosaics for 1881, in cloth 50
1 copy Photo Colorists' Guide, . 75
1 copy About Photography and Photographers 50
British Journal Almanacs for 1889, reduced to 40
1—15-in Entrekin Rotary Burnisher 17 00
1—15-in Entrekin Eureka Burnisher 15 00
1—Fuming Box 4 00
1—15x18 Deep Porcelain Tray . 3 00
1—15x18 Japan Tray 50
1—Iron Centre Camera Stand, . 3 00
1—14-in Eureka Burnisher . . 16 00
1—Seavey Swiss Cottage Accessory 12 00
1—8x10 Exterior Ground, good condition, ... 10 00
2—Spencer Head-rests 11 00
British Journal Almanacs for 1878 20
Photo Mosaics for 1883, ... 20
1—8x10 Plain painted ground . 3 00
1—8x10 Osborne's interior background, new, light left . . . 20 00
1—4x8 Osborne's side slip . . . 7 50
Pearl leads, the best retouching point in the market, each . 15
5x8 Woodbury Dry Plates PER DOZ. 80
4¼x6½ " " . . . 65
6½x8½ Triumph " . . . 85
5x7 " " . . . 55
4¼x6½ " " . . . 45
5x8 Neidhardt " . . . 65
4x5 Bridle " . . . 35
1—8x10 Hough's Exterior ground, good as new, light left of sitter 9 00
1—8x10 Hough's Exterior ground, light right 8 00
1—Hough's Oak Stump 7 50
1—Osborne's No. 71 Rock Accessory 9 00
1—Osborne's Bridge Accessory . 8 00
1—Osborne's Gate Combination Accessory, new 18 00
1—Knickerbocker Camera Stand, with Acme top 5 00
1—6x6 Chiidren's Fancy Ground 3 00
1—15 inch Smith & Pattison, Quadruplex Enameler, ... 25 00

Camera Boxes:

1—4 x 5 Waterbury Detective Camera, fitted with Roll Holder, in good condition, . 18 00
1—Gray's Vest Camera 9 00
1—Woodward Solar Camera, 7-in. condensing lens and ½ size Voigtlander lens 25 00
1—½ size Ferro. Camera, 4 ⅛ tubes and stand 10 00
1—4x5 Flammang revolving back Camera, lens and tripod, new; reduced from $37 to . . . 25 00
1—17x20 American Optical Co.'s Double Swing Portrait Camera, Bonanza Holder, good as new 75 00
1—5x8 Blair View Camera, single swing 17 00
1—Climax Outfit, including chemicals, complete 3 50
1—17x20 D. S. View Camera, good condition 40 00
1—5x8 Tourist Outfit, including 5x8 Tourist Camera Box, 2 Daisy Plate Holders, 1 Extension Tripod, and 1 Canvas Carrying Case, very little used. Price, new, $40.50, will sell for 30 00
1—10x12 Cone View Camera, Double Swing, new 52 80
1—5x8 Wet Plate Stereo Camera, 3 holders, case and tripod 25 00
1—6½ x 8½ View Camera and Lens, ... 12 00
1—6½x8½ American Optical Co. first qual. View Camera . . 23 00
1—4¼x5½ Ex. qual. Portrait Camera 17 50
1—5x8 American Optical Co. Stereo Camera 25 00
1—5x8 Blair Compact Camera, good as new 35 00
4—5x8 Feather Weight Holders, each 75

1—No. 43 B, 8x10 Double Swing Anthony's Portrait Comera, with Benster Holder, good as new 25 00
1—8x10 Double Swing Cincinnati Portrait Camera 18 00
1—5x8 '76 View Camera, with lens holder, case and tripod 15 00
1—4x5 Anthony's View Camera, with lens, tripod, camera case and six double holders in good condition 16 00
1—½ size Wet Plate Camera, good for lantern slides . . . 2 00

Lenses:

1—4x4 Harrison Portrait Lens . 18 00
1—6½x8½ View Lens 3 50
1 set ⅓ Tubes 18 00
1—11x14 Zentmayer Lens, with all the smaller combinations . 50 00
1—½ size Voigtlander Portrait Lens 12 00
1—Matched pair E. A. Stereoscopic Lenses 8 00
1—14 x 17 Voigtlander Portrait Lens 60 00
1—No. 9, 11x14, Ross Portable Symmetrical Lens 60 00
1—11x14 Harrison Double View Lens 15 00
1—4x5 J. A. K. Single View Lens 2 00
1—Extra 4–4 Roettger Portrait Lens 20 00
1—2A Dallmeyer Lens 82 00
1—14x17 Roettger Lens 45 00
1—8x10 Beck Lens, good as new, fitted with Prosch Shutter . 60 00
1—set ¼ Darlot Tubes 13 00
1—4–4 Holmes, Booth & Hayden Portrait Lens 25 00
1—½ size Voigtlander Lens . . 25 00
1—½ size L. W. Krantz Portrait Lens 12 50
1—½ size C. C. Harrison Portrait Lens 8 00
1—½ size Darlot quick acting Portrait Lens, central stops . 18 00
1—No. 6, 17x20 Darlot wide-angle Hemispherical Lens 35 00
1—8x10 Voigtlander Portrait Lens 80 50
1—4–4 Dallmeyer Group Lens . 50 00
1—4–4 Walzl Portrait Lens . . 20 00
1—¼ size Harrison Portrait Lens 5 00

A FIRST-CLASS retoucher wishes a situation where he can learn operating. Address,
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WANTED—Situation as operator and retoucher; will also assist at printing. Address, Box 754, Palmyra, N. Y.

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GUS. CORS,
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AN Operator who is original, as well as a fine lighter and poser, will be open for position October 1st.
OPERATOR,
252 Essex St., Salem, Mass.

WANTED.—A man who can operate, print, tone and retouch. Must be a first-class retoucher and printer. Send samples. W. H. PANNEBECKER,
Ashland, Pa.

WANTED.—An A 1 Photo Printer.
Apply at 635 Arch Street, Phila.

FOR SALE.—Photographic Gallery, finely equipped, heated by steam, prices first class. Town about 8000, important R. R. centre; central part of New York. Address,
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